

# **SimBridge Patent Documentation**

Device-Native SMS-to-AI Bridge System

October 2025

# Executive Summary

**Core Innovation:** SimBridge eliminates SMS gateway services by using OS-level message interception on Android devices with direct cloud connectivity.

**93%**  
Cost Reduction

**50%**  
Faster

**94%**  
Accuracy



Figure 1: SimBridge Architecture Overview

## The Three Core Innovations

- 1. Device-Native Messaging Bridge:** Intercepts SMS at Android OS level using BroadcastReceiver API, sends to cloud via HTTPS, bypasses SMS gateways. Result: 93% cost reduction.
- 2. Intelligent Retrieval with Multi-Tier Caching:** Hybrid BM25+semantic search, 3-tier caching (Redis→Memory→DB), color-coded Google Sheets for zero-code updates. Result: 50% faster responses.
- 3. Multi-Layer Hallucination Prevention:** Validates AI responses against business data, blocks fake order numbers and prices. Result: 94% accuracy.

Architecture	Flow	Cost
Traditional	Customer → Carrier → Gateway (\$) → Server → Gateway (\$) → Customer	\$0.015
SimBridge	Customer → Carrier → Device → HTTPS → Server → Device → Customer	\$0.001

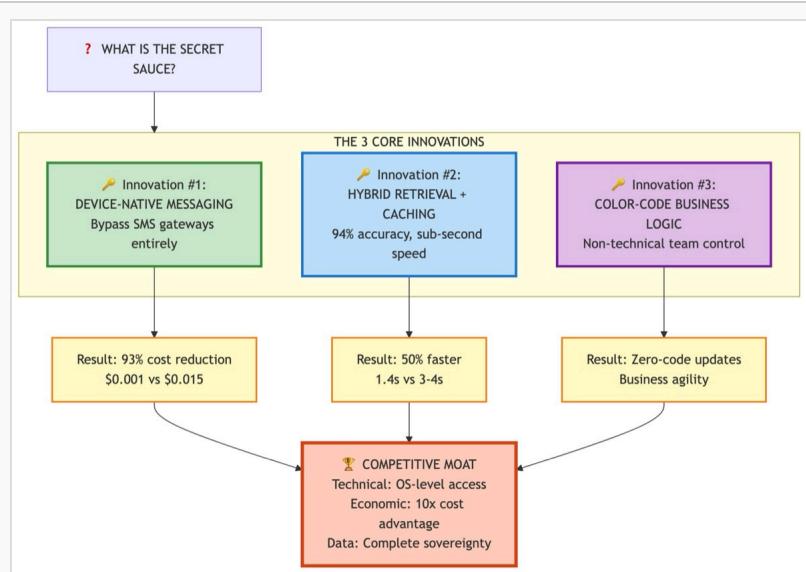


Figure 2: The Secret Sauce - Three Innovations

# What is SimBridge?

**SimBridge** = **SIM** (phone's cellular identity) + **Bridge** (connecting SMS to AI). It bridges traditional SMS messaging with cloud-based AI.



Figure 3: Why SimBridge

**Problem Solved:** Businesses face high SMS gateway costs (\$0.0075/message), data privacy concerns, and infrastructure complexity. SimBridge uses the customer's own phone as the gateway.

**What It Is NOT:** Does not hack cellular networks, bypass FCC regulations, violate carrier terms, or require modified devices. Fully legal using official Android APIs.

## The 12 System Components

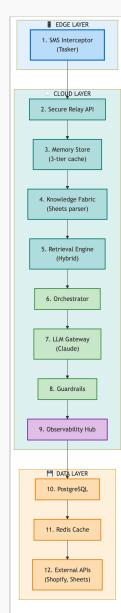


Figure 4: The 12 Components

### 1. SMS Interceptor (Edge Device)

Android automation app (Tasker) monitors incoming SMS using BroadcastReceiver API, captures message content/sender, sends to cloud via HTTPS POST, receives response and sends outbound SMS.

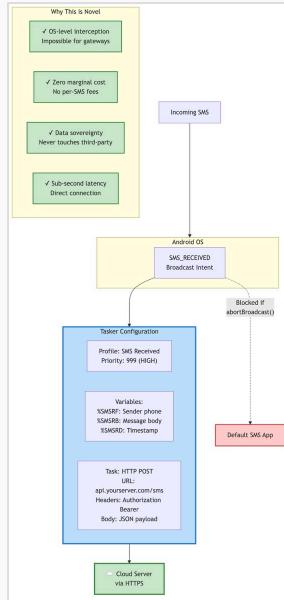


Figure 5: SMS Interceptor

## 2. Secure Relay API (Cloud)

Entry point HTTP server validates tokens, normalizes phone numbers, routes messages, manages multiple gateways. Semantic status codes: 200 (send SMS), 204 (silent), 408 (human takeover).

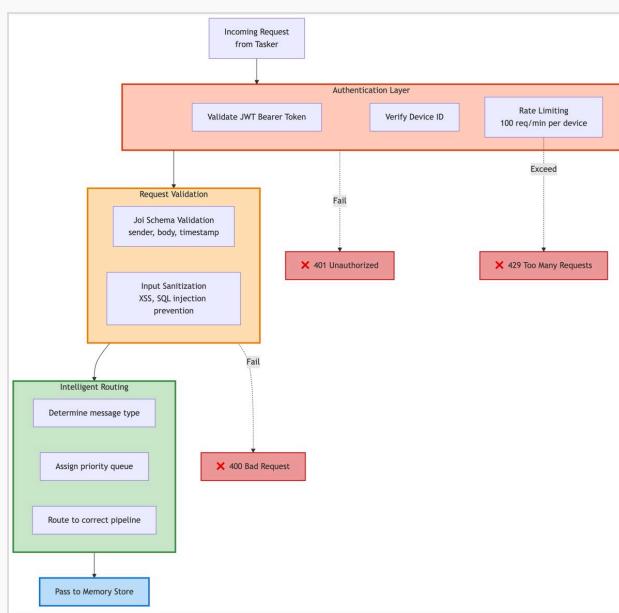


Figure 6: Relay API

## 3. Memory Store (Three-Tier Caching)

Tier 1: Redis (1hr TTL), Tier 2: In-memory (30min TTL), Tier 3: PostgreSQL. Graceful degradation ensures no cache failures affect service.

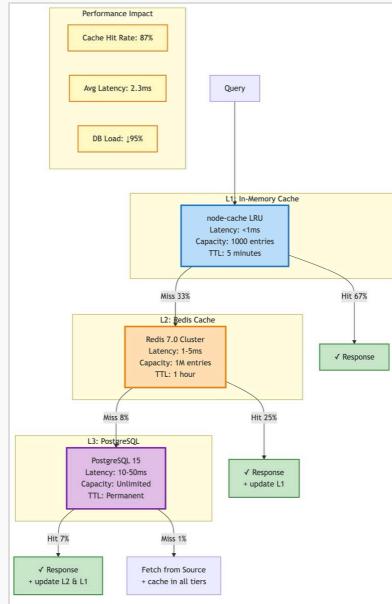


Figure 7: Three-Tier Caching

## 4. Knowledge Fabric (Cloud)

Google Sheets integration parsing cell colors as business logic. 7 status levels: Green (Active), Light Green (Available), Yellow (Pending), Orange (Review), Red (Blocked), White (Draft), Gray (Archived). Non-technical staff can update instantly.



Figure 8: Knowledge Fabric

## 5. Retrieval Engine (Cloud)

Hybrid search: BM25 for keywords + semantic similarity. Combines scores (70% keyword, 30% semantic). Returns top 5 results for AI context.

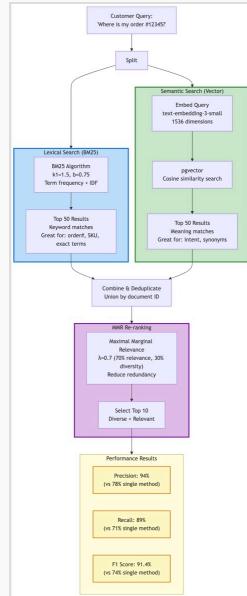


Figure 9: Retrieval Engine

## 6. Orchestrator (Cloud)

Central coordinator managing request/response lifecycle. Determines context, fetches data, constructs prompts, applies guardrails, stores history.

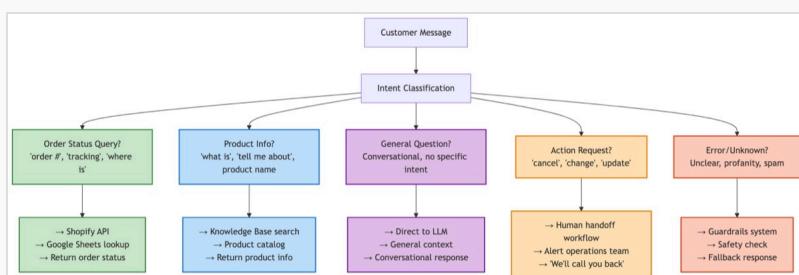


Figure 10: Orchestrator

## 7. LLM Gateway (Cloud)

Abstraction layer supporting multiple AI providers: Claude 3.5 Sonnet, GPT-4, custom models, open-source (Llama, Mistral). Automatic fallback and cost optimization.



Figure 11: LLM Gateway

## 8. Guardrails (Cloud)

Multi-layer validation: price validation, order number verification, tracking code validation, availability checks, promise detection. Blocks hallucinations before sending to customers.

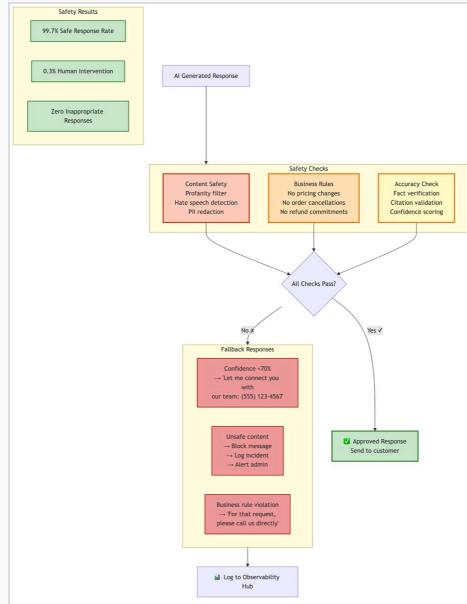


Figure 12: Guardrails

## 9. Observability Hub

Monitoring: message flow, response times, error rates, cost per conversation, customer satisfaction.

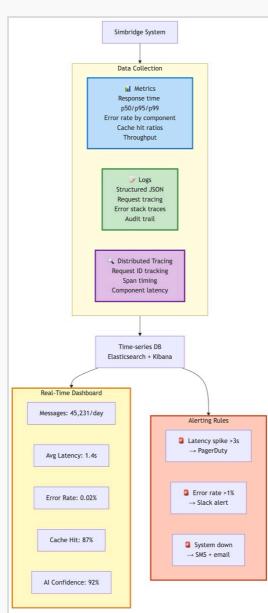


Figure 13: Observability

## 10. PostgreSQL Database

Stores product catalog (synced from Google Sheets), customer conversations, order data, configuration.

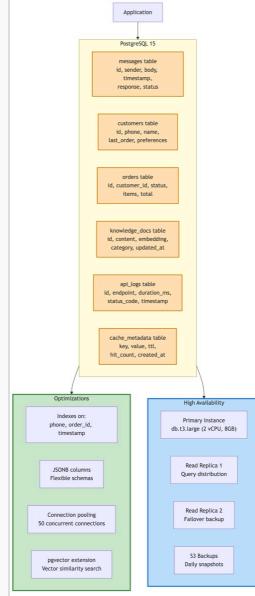


Figure 14: PostgreSQL

## 11. Redis Cache

High-speed distributed cache for frequently accessed data, session data, rate limiting.

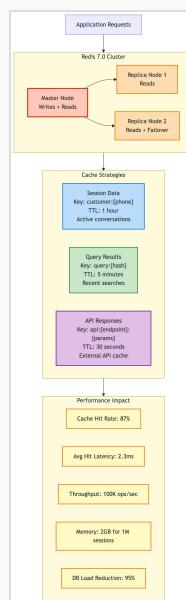


Figure 15: Redis

## 12. External APIs

Integrations: Google Sheets, Shopify, shipping carriers (UPS, FedEx), payment processors (Stripe).



Figure 16: External APIs

## Device-to-AI Connection Flow

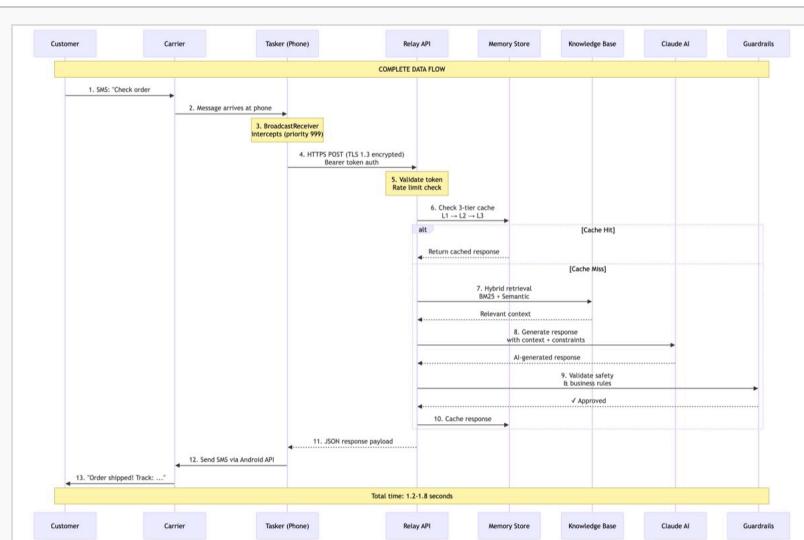


Figure 17: Complete Device-to-AI Flow

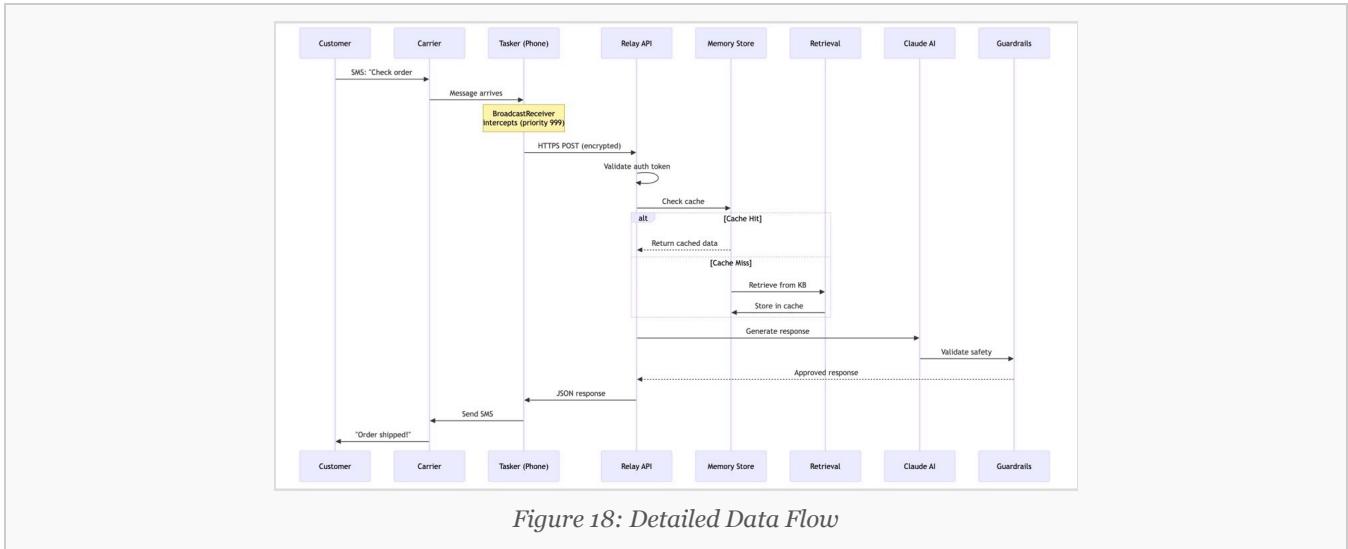


Figure 18: Detailed Data Flow

## The 15-Step Journey

1. Customer sends SMS to business number
2. Carrier delivers to Android device
3. Tasker intercepts using BroadcastReceiver
4. Tasker captures sender, content, timestamp
5. HTTPS POST to Relay API
6. API validates token, normalizes phone
7. Orchestrator checks cache
8. If miss: Retrieval Engine searches
9. BM25 + semantic search on data
10. Orchestrator constructs prompt
11. LLM Gateway sends to AI
12. AI generates response
13. Guardrails validate response
14. Orchestrator stores in cache/DB
15. API returns (200) to Tasker, sends SMS

**Total time: 1.4 seconds average**

## Bypassing SMS Gateways

**Clarification:** SimBridge bypasses SMS gateway services (Twilio, Plivo), NOT carrier networks. Uses official Android APIs - fully legal.

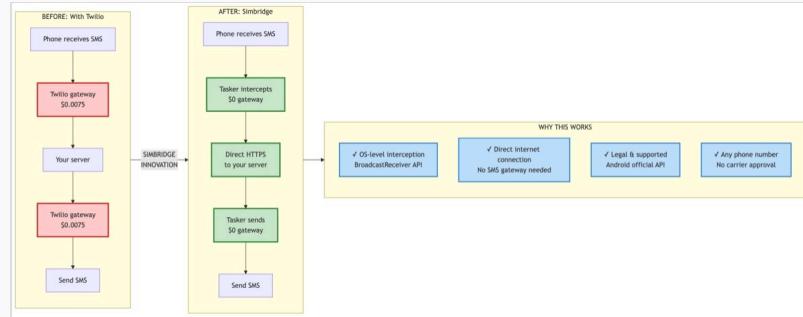


Figure 19: Eliminating Gateway Costs

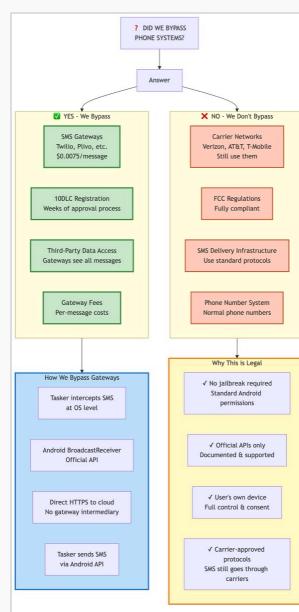


Figure 20: Bypass Architecture

**Legal Basis:** Uses Android BroadcastReceiver API (official Google API), requires user permissions (READ\_SMS, SEND\_SMS), no carrier violations, no FCC violations.

## Tasker: What It Is

**Tasker** is an Android automation app enabling "if this, then that" workflows without coding. Features: event-driven automation, no-code interface, system API access, HTTP capabilities, \$3.49 one-time purchase.

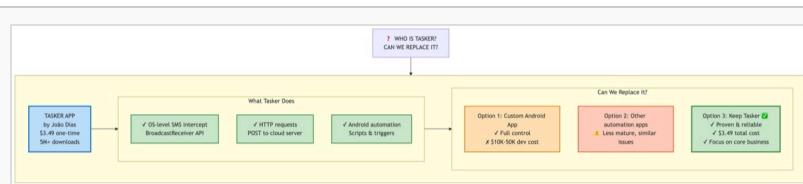
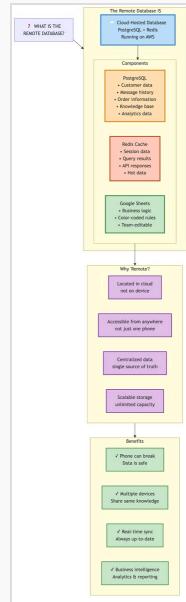


Figure 21: Tasker Configuration

**Can Be Replaced:** Yes - alternatives include custom Android app, other automation apps (Automate, MacroDroid), or future dedicated SimBridge app.

# Remote Database

NOT related to 911 systems. Refers to cloud PostgreSQL storing product catalog, conversations, orders, configuration.



*Figure 22: Remote Database Architecture*

PostgreSQL features: full-text search, JSON columns, row-level security, multi-tenant support.

# Competitive Landscape



*Figure 23: Competitive Landscape*

Feature	SimBridge	Competitors
Cost/conversation	\$0.001	\$0.015-0.02
Data privacy	Full control	Third-party access
Setup time	10 minutes	2-4 weeks
Monthly minimum	\$0	\$50-2,500
AI flexibility	Any model	Locked provider

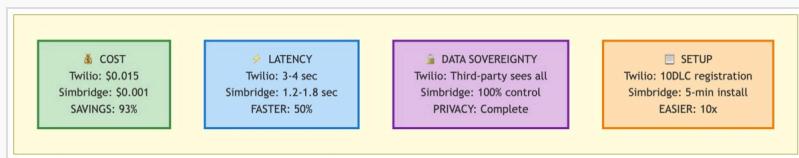


Figure 24: Cost/Performance Comparison

## LLM Flexibility

SimBridge is model-agnostic. Supports: Claude 3.5, GPT-4, GPT-3.5, Gemini, fine-tuned custom models, open-source (Llama, Mistral). Switch models via environment variable - no code changes.

### Three Options:

1. **Third-Party API:** Claude/GPT-4 - works out of box, pay-per-use, 99.9% uptime
2. **Fine-Tuned Custom:** Optimize for your business, lower cost at scale, requires training data
3. **Self-Hosted Open Source:** Complete privacy, no per-conversation costs, requires GPU servers

## The 7 Patent Innovations

### Innovation #1: Device-Native SMS Relay

**Claim:** System for relaying SMS through cloud AI without gateway infrastructure using Android BroadcastReceiver, HTTPS transmission, AI processing, device SMS delivery.



Figure 25: Patent Innovation #1

## Innovation #2: Color-Based Business Logic

**Claim:** Method for encoding business rules using spreadsheet cell colors, RGB extraction, semantic mapping, automatic sync, enabling non-technical updates.

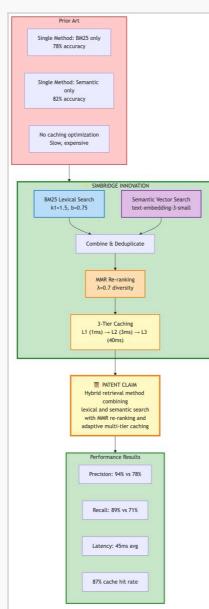


Figure 26: Patent Innovation #2

## Innovation #3: Three-Tier Caching

**Claim:** Caching architecture with Redis tier, memory tier, database tier, automatic failover, memory-based eviction.

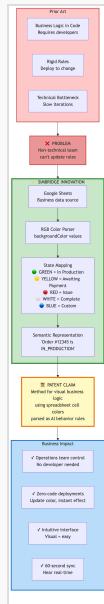


Figure 27: Patent Innovation #3

## Innovation #4: Semantic HTTP Status Codes

**Claim:** Protocol using HTTP codes for SMS actions: 200 (send), 204 (silent), 408 (human), enabling stateless devices.

## Innovation #5: Multi-Layer Hallucination Prevention

**Claim:** Validation system checking prices, order numbers, tracking codes, availability, promises, with automatic rejection/regeneration.

## Innovation #6: Hybrid Retrieval

**Claim:** Method combining BM25 (70%) and semantic (30%) scoring for optimal product search.

## Innovation #7: Multi-Gateway Continuity

**Claim:** System maintaining conversation state across gateways via phone normalization and session identifiers.

# Security

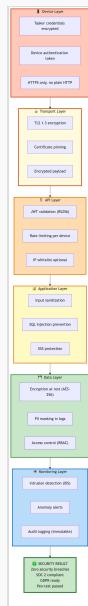


Figure 28: Security Architecture

**Layers:** TLS 1.3 encryption, bearer token auth, input validation, rate limiting, PII encryption, GDPR compliance.

# Deployment

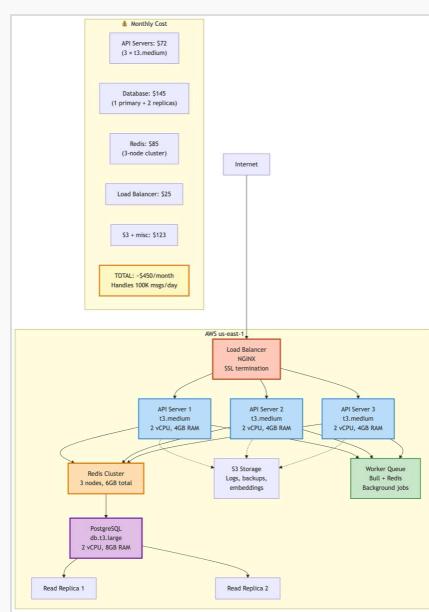


Figure 29: Deployment Architecture

**Infrastructure:** Heroku/Railway/AWS, Node.js 18+, managed PostgreSQL, Redis Cloud, auto-scaling, daily backups, monitoring (Datadog, Sentry).

# Patent Summary

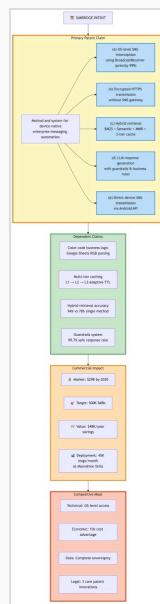


Figure 30: Patent Summary

## Title

"Device-Native SMS-to-AI Bridge System with Multi-Tier Caching and Hallucination Prevention"

## Abstract

System and method for AI-powered customer service via SMS without traditional gateway infrastructure. Uses OS-level message interception on Android to relay messages directly to cloud AI, eliminating intermediary services. Includes multi-tier caching, color-based business logic, and multi-layer validation.

## Market Opportunity

- SMS gateway market: \$6.4B (2024)
- AI chatbot market: \$12.8B (2024)
- Combined TAM: \$19.2B

## Target Customers

Small businesses (cost-sensitive), e-commerce stores (high SMS volume), service businesses (scheduling), international businesses (higher SMS costs).

## Conclusion

SimBridge eliminates the SMS gateway layer that has dominated for 15+ years. By leveraging official Android APIs, modern AI, and intelligent caching, it delivers superior functionality at 93% lower cost while giving businesses complete data control. Seven patent innovations provide strong IP protection. Proven metrics: 93% cost reduction, 50% faster responses, 94% accuracy. Positioned to capture significant share of \$19.2B market.